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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/931,457      | 08/16/2001  | Saverio Carl Falco   | BB1116 US CIP       | 3268             |

23906 7590 02/09/2006

E I DU PONT DE NEMOURS AND COMPANY  
LEGAL PATENT RECORDS CENTER  
BARLEY MILL PLAZA 25/1128  
4417 LANCASTER PIKE  
WILMINGTON, DE 19805

EXAMINER

BAUM, STUART F

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

1638

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>09/931,457 | <b>Applicant(s)</b><br>FALCO ET AL. |  |
|                              | <b>Examiner</b><br>Stuart F. Baum    | <b>Art Unit</b><br>1638             |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 August 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16 and 18-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>sequence search results (2)</u> .      |

## DETAILED ACTION

### *RCE Acknowledgment*

1. The request filed on 8/11/2005 for a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114, based on parent Application No. 09/931,457 is acceptable and a RCE has been established. An action on the RCE follows.

2. Claims 16, and 18-25 including SEQ ID NO:30 encoding SEQ ID NO:31 are pending and are examined in the present office action.

3. In the "Response After Allowance" filed 8/11/2005, Applicant requested that the filing date of the instant application be changed back to 8/16/2001 from 2/22/2002.

The Office has changed the filing date back to 8/16/2001, and a corrected filing receipt will be mailed to Applicant.

4. In the "Response After Allowance," filed 8/11/2005, applicant also requested the Office to charge the extension of time fee for the prior (parent) application number 09/424,976. MPEP 201.06(c)(X. Extensions of Time) provides that "[i]f an extension of time is necessary to establish continuity between the prior application and the continuing application filed under 37 CFR 1.53(b), the petition for an extension of time must be filed as a separate paper directed to the prior nonprovisional application." (Emphasis added.)

Applicant states that the instant application was filed in response to a restriction requirement made in prior application number 09/424,976 and provided a fee authorization for the extension of time with the filing papers of the instant application (09/931,457). Applicant,

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however, failed to file the fee authorization for the extension of time as a separate paper directed to the prior application. The Office cannot use the fee authorization filed in the instant application to charge the extension of time fee required in the prior application. Accordingly, the prior application was abandoned prior to the filing of the instant application. This means there is no copendency between this application and the prior application and the benefit claims to the prior application. This means that the claimed benefit to the provisional application is not proper. Therefore, the effective priority date of the instant application is 8/16/2001.

In order for this application to claim the benefit of nonprovisional application 09/424,976 and provisional applications 60/065,385 and 60/049,406, Applicant is required to file a petition to revive prior application 09/424,976 for the purposes of copendency. Applicant may use form PTO/SB/64 for filing the petition.

### ***Specification***

5. The first paragraph of the specification is objected to because Applicant's priority statement is incorrect, as discussed above.

### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 16, and 18-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Falco et al (December, 1998, WO 98/56935).

The claims are drawn to an isolated polynucleotide comprising a nucleotide sequence encoding a polypeptide having cysteine synthase activity, wherein the polypeptide has an amino

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acid sequence of at least 95% sequence identity to SEQ ID NO:31, or the full length complement, or wherein the amino acid sequence comprises SEQ ID NO:31, or wherein the nucleotide sequence comprises SEQ ID NO:30; a vector comprising said polynucleotide, a recombinant DNA construct comprising said polynucleotide operably linked to at least one regulatory element, or a method of transforming a cell comprising said polynucleotide, or a cell comprising the recombinant DNA construct, or a plant or seed comprising said recombinant DNA construct.

Falco et al disclose a polynucleotide comprising a nucleotide sequence encoding SEQ ID NO:31, which exhibits 100% sequence identity with SEQ ID NO:31 from the instant application (see enclosed sequence search results) wherein said nucleotide sequence comprises SEQ ID NO:30 (page 6, lines 7-10). SEQ ID NO:30 from WO 98/56935 exhibits 100% sequence identity with SEQ ID NO:30 of the instant application (see enclosed sequence search results). Falco et al disclose transforming monocot or dicot cells with said nucleotide sequence wherein said nucleotide sequence is subcloned into a construct comprising a promoter located 5' and a terminator located 3' to said nucleotide sequence, wherein said construct is inserted into a transformation vector that is used to transform either monocot or dicot cells, which are eventually regenerated into whole plants (pages 23-26, Example 3-4). Falco et al discloses transformed plant or plant seeds comprising said nucleotide sequence (page 27, Example 5) and as such, Falco et al anticipate the claimed invention.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claim 23 is rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

The claim recites “A cell comprising” which reads on a human being. Amending the claim to recite “An isolated cell” will obviate the rejection.

8. No claims are allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Anne Marie Grunberg can be reached at 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

A handwritten signature in black ink, appearing to read "Stuart F. Baum". The signature is fluid and cursive, with the first name "Stuart" and last name "Baum" clearly distinguishable.

Stuart F. Baum Ph.D.

Patent Examiner

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January 30, 2006

GenCore version 5.1.6  
Copyright (c) 1993 - 2004 CompuGen Ltd.

OM protein - nucleic search, using frame\_plus.p2n model

Run on: May 21, 2004, 20:33:12 ; Search time 530 seconds  
(without alignments)  
2605.027 Million cell updates/sec

Title: US-09-931-457A-31  
Perfect score: 1623  
Sequence: 1 MAVRSIGANDVELIGKTP.....LSSVLPSVRRREBSMTPEP 325

Scoring table:  
BLOSUM62  
Xgapop 10.0 , Xgapext 0.5  
Ygapop 10.0 , Ygapext 0.5  
Fgapop 6.0 , Fgapext 7.0  
Delop 6.0 , Delext 7.0

Searched: 3373863 seqs, 2124099041 residues  
Total number of hits satisfying chosen parameters: 6747726

Minimum DB seq length: 0  
Maximum DB seq length: 2000000000  
Post-processing: Minimum Match 0%  
Maximum Match 100%  
Listing first 45 summaries

Command line parameters:  
-MODEL=frame+ p2n.model -DRV=xlb  
-Q=/cpm2.1/USEP2 pool/US09931457/runat 18052004 121728 20289/app query.fasta 1.519  
-DB=N\_Geneseq 29Jan04 -QMT=fastcap -SUFFIX=p2n.rng -MINMATCH=0.1 -LOOPCL=0  
-LOOPEXT=0 -UNITS=bits -START=1 -END=1 -MATRIX=blosum62 -TRANS=human40.cdi  
-LIST=45 -DOALIGN=200 -THR SCORE=ext -THR MAX=100 -THR MIN=0 -ALIGN=15  
-MODE=LOCAL -OUTFFT=ptc -NOBK=ext -HEAPSIZE=500 -MINLEN=0 -MAXLEN=2000000000  
-USER=US09931457.ecgn 1 1 470 runat 18052004 121728 20289 -NCFU=6 -ICPU=3  
-NO MAP -LANG=QUERY -NEG SCORES=0 -WAIT -DSFBLOCK=100 -LONGLOG  
-DEV TIMEOUT=120 -WARN TIMEOUT=30 -THREDS=1 -XGAPOP=10 -XGAPEXT=0.5 -FCGAPOP=6  
-FCGAPEXT=7 -YGAPOP=10 -YGAPEXT=0.5 -DSLOP=6 -DELEXT=7

Database : N\_Geneseq 29Jan04:  
1: Geneseq1980s:  
2: Geneseq1990s:  
3: Geneseq2000s:  
4: Geneseq2001as:  
5: Geneseq2001bs:  
6: Geneseq2002as:  
7: Geneseq2002as:  
8: Geneseq2003bs:  
9: Geneseq2003cs:  
10: Geneseq2004s:

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

# SUMMARIES

| Result No. | Score | Query Match | Length | DB ID    | Description |
|------------|-------|-------------|--------|----------|-------------|
| 1          |       |             |        | AAV99906 | Fragment    |
| 2          |       |             |        | AAQ44450 | Cysteine    |
| 3          |       |             |        | ADC76317 | DNA homol   |
| 4          |       |             |        | AAC42360 | Arabidops   |
| 5          |       |             |        | ABZ13088 | Arabidops   |
| 6          |       |             |        | ADA68423 | Arabidops   |
| 7          |       |             |        | ADA69412 | Rice gene   |
| 8          |       |             |        | ADA70437 | Rice gene   |

|    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 9  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 |
| 10 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 |
| 11 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 |
| 12 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 |
| 13 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 |
| 14 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 |
| 15 | 1193 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 16 | 1193 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 17 | 1179 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 18 | 1179 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 19 | 1179 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 20 | 1166 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 21 | 1166 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 22 | 1129 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 23 | 1125 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 24 | 1125 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 25 | 1077 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 26 | 1065 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 27 | 1045 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 28 | 1045 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 29 | 1017 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 30 | 1006 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 31 | 982  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 32 | 980  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 33 | 974  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 34 | 973  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 35 | 968  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 36 | 962  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 37 | 962  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 38 | 949  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 39 | 949  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 40 | 949  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 41 | 949  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 42 | 949  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 43 | 949  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 44 | 941  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |
| 45 | 941  | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 |



PA (DUPO) DU PONT DE NEHOURS & CO E I.  
 XX Falco SC, Allen SM, Thorpe CJ;  
 PI MPI: 1999-080910/07.  
 DR P-PSDB; AAR81018.  
 XX New isolated plant amino acid biosynthetic enzyme nucleic acids - which  
 PT encode aspartic semialdehyde dehydrogenase, diaminopimelate  
 PT decarboxylase, homoserine kinase, cysteine synthase and cystathionine  
 PT beta-lyase.  
 XX Claim 17; Page 57-58; 80pp; English.  
 XX Organisation of the pathway leading to plant biosynthesis of lysine,  
 CC threonine, methionine, cysteine and isoleucine suggests that over-  
 CC expression or reduction of expression of genes encoding enzymes involved  
 CC in that biosynthetic pathway could be used to alter the level of these  
 CC amino acids in human food and animal feed. This may increase the  
 CC nutritional quality of human food and animal feed by increasing the  
 CC production and accumulation of specific free amino acids. The enzymes  
 CC include aspartic semialdehyde dehydrogenase, homoserine kinase,  
 CC diaminopimelate decarboxylase, cysteine synthase and cystathionine beta-  
 CC lyase. The nucleic acids encoding these enzymes can be used for altering  
 CC the level of expression of the enzymes and for evaluating compounds for  
 CC their ability to inhibit the enzymes' activity  
 XX Sequence 1362 BP; 388 A; 243 C; 330 G; 401 T; 0 U; 0 Other;

Alignment Scores:  
 Pred. No.: 3 25e-151 Length: 1362  
 Score: 1623.00 Matches: 325  
 Percent Similarity: 100.00% Conservative: 0  
 Best Local Similarity: 100.00% Mismatches: 0  
 Query Match: 100.00% Indels: 0  
 DB: 2 Gaps: 0

US-09-931-457A-31 (1-325) x AAV999906 (1-1362)

Oy 1 MetAlaValGluArgSerGlyLysLeuValThrGluLeuLeuGlyLysThrPro 20  
 Db 90 ATGGCTGTTCGAAGGTCGGAATGCGAAGATGTTACGGAATGATGGTAAACCCCA 149  
 Oy 21 LeuValThrLeuLeuValLeuAlaValGluValAlaValAlaValLeuGlu 40  
 Db 150 TTAGTATATCTAATTAATTAATCTGCGATGTTGTTGTCGCGGTGCTGAATCGAG 209  
 Oy 41 LeuMetGluProCysSerSerValLysAspAlaGlyLysThrMetIleAlaAspAla 60  
 Db 210 TTGATGAGCCATGCTCTAGTGTGAGGACAGATGCGGTATGATGATGCTGATGCA 269  
 Oy 61 GluGluValGlyLeuLeuThrProGlyLysSerValLeuLeuGluProThrSerGlyVal 80  
 Db 270 GAGAGAGAGGCACTTATACACCTGGAAGAGTGTCTCTATTGAGCCCAAGAGTGTAT 329  
 Oy 81 ThrGlyLysGlyLeuAlaPheMetAlaAlaValGlyLysLeuLeuLeuThrMet 100  
 Db 330 ACTGGCATTTGATTTAGCTTCTATGCGAGGACGAGGCTTACAGCTCATTAATTAATG 389  
 Oy 101 ProLysSerMetSerLeuGluArgGlyLysLeuAlaPheGlyValGluLeuVal 120  
 Db 390 CCTGCTTCTATAGTCTTGAAGAGATCATCTTATTAGCTTTTGGAGCTGATTTGGCT 449  
 Oy 121 LeuThrAspProAlaValGlyMetLysGlyAlaValGluLeuValAlaGluLeuLeuAla 140  
 Db 450 CTGACATCTCTCTAAGGAAATGAAGGTGCTGTTTCAAGAGGCTGAAGAGATATTGGCT 509  
 Oy 141 LysThrProAlaValThrLeuGluGlnPheGluAsnProAlaAsnProLysValHis 160  
 Db 510 ARGAGGCCCATTCCTACATCTTCAACATTTGAAACCTGCTCCATCCCAAGTTTCA 569  
 Oy 161 TyrGluThrThrGlyProGluLeuLeuThrLysGlySerAspGlyLysLeuAlaPheVal 180

Db 570 TATGAACCACTGCTCCAGAGATATGGAAGGCTCCGATGGGAAATTCATGCAATTTGTT 629  
 Oy 181 SerGlyLysGlyThrGlyLysThrGlyValGlyLysThrGlyLysGluGlnAsn 200  
 Db 630 TCTGGCATAGGCACTGCTGTATCAATTAACAGGTGCTGGAAATATCTTAAAGAGCACAAT 689  
 Oy 201 ProAsnLeuLeuLeuLeuLeuValGluProValGluSerProValLeuSerGlyLys 220  
 Db 690 CCGATATTAAGCTGATTTGTTGGAACCACTTGAATGTCAGTCTCTCAGAGAGGAAG 749  
 Oy 221 ProGlyProHisLysIleGlnGlyLysLeuAlaGlyLysLeuValGluVal 240  
 Db 750 CTTGGTCCACACAGATTCAGGGATTGCTGCTGTTTATCTCTGCTGCTTGGAAATC 809  
 Oy 241 AsnLeuLeuAspGluValValGlnLysSerSerAspGluAlaIleGluThrAlaLysLeu 260  
 Db 810 AATCTTCTTGATGATGCTGTTCAATATCAATGATGATGATGATGATGATGATGATGAT 869  
 Oy 261 LeuAlaLeuLysGluLeuPheValGlyLysSerSerGlyAlaAlaAlaAlaAla 280  
 Db 870 CTTGCGCTTAAGAGAGGCTTATTTGGAATATCTTCCGAGGCTGCGCTGCTGCTGCT 929  
 Oy 281 PheGlnIleAlaLysArgProGluLeuAlaGlyLysLeuLeuValAlaValPheProSer 300  
 Db 930 TTTCAAGATTGCAAAAGACCAAAATCCCGGAGAGCTTATTTGTCGCTTTTTCGAGC 989  
 Oy 301 PheGlyGluArgTyrLeuSerSerValLeuPheGluSerValArgArgGluAlaGluSer 320  
 Db 990 TTGCGGAGAGGATACCTGCTCTCGTCTATTTGAGTCACTGAGTCACTGAGTCACTGAG 1049  
 Oy 321 MetThrPheGluPro 325  
 Db 1050 ATGACTTTTGAGCCC 1064  
 RESUB 2  
 AAO4 50  
 ID A044450 standard; cDNA to mRNA; 1303 BP.  
 AC A044450;  
 XX 1 OCT-1994 (first entry)  
 DT Cysteine synthase.  
 DE Cysteine synthase.  
 KM Cysteine synthase; plant; expression; probe; ss.  
 XX Spinacia oleracea.  
 XX Key Location/Qualifiers  
 FH CDS 52..1029  
 FT /tag= a  
 XX JP06038770-  
 XX 15-FEB-1994.  
 XX 05-FEB-1992; 2JP-00020315.  
 XX 05-FEB-1992; 2JP-00020315.  
 XX (MITS) MITSUBISHI CORP.  
 XX (MITS) MITSUBISHI CASEI CORP.  
 XX WPI; 1994-094834/12.  
 DR P-PSDB; AAR49830.  
 XX Novel gene coding cysteine synthase - used to increase the cysteine  
 PT content of an agricultural plant.  
 PT Claim 2; Page 4-6; 6pp; Japanese.  
 XX The cysteine content in an agricultural product can be increased by  
 CC expressing the cysteine synthase in a plant. Probes V822 and V812 used in

Mon May 24 08:18:49 2004

us-09-931-457a-30.rng

Page 1

GenCore version 5.1.6  
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OM nucleic - nucleic search, using sw model

Run on: May 23, 2004, 07:37:59 ; Search time 653 Seconds  
(without alignments)  
8860.713 Million cell updates/sec

Title: US-09-931-457A-30  
Perfect score: 1362  
Sequence: 1 acttctgagtcgtatag.....aaaaaaaaaaaaaaaaaaaaa 1362

Scoring table: IDENTITY NUC  
Gapop 10.0 , Gapext 1.0

Searched: 3373863 seqs, 2124099041 residues  
Total number of hits satisfying chosen parameters: 6747726

Minimum DB seq length: 0  
Maximum DB seq length: 2000000000  
Post-processing: Minimum Match 0  
Maximum Match 100  
Listing first 45 summaries

Database : N: Geneseq 29Jan04.\*  
1: Geneseq1980s.\*  
2: Geneseq1990s.\*  
3: Geneseq2000s.\*  
4: Geneseq2001as.\*  
5: Geneseq2001bs.\*  
6: Geneseq2002s.\*  
7: Geneseq2003as.\*  
8: Geneseq2003bs.\*  
9: Geneseq2003cs.\*  
10: Geneseq2004s.\*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

| Result No. | Score | Query Match | Length | DB | ID       | Description        |
|------------|-------|-------------|--------|----|----------|--------------------|
| 1          | 1362  | 100.0       | 1362   | 2  | AAV99906 | AAV99906 Fragment  |
|            |       |             |        |    |          | Aac42360 Arabidops |
|            |       |             |        |    |          | Aac44450 Cystatins |
|            |       |             |        |    |          | Aac46317 DNA homol |
|            |       |             |        |    |          | Abz13088 Arabidops |
|            |       |             |        |    |          | Ada68423 Arabidops |
|            |       |             |        |    |          | Ada69412 Rice gene |
|            |       |             |        |    |          | Ada70437 Rice gene |
|            |       |             |        |    |          | Aac47413 Spinach c |
|            |       |             |        |    |          | Aac34662 Arabidops |
|            |       |             |        |    |          | Aac33559 Arabidops |
|            |       |             |        |    |          | Aac64221 Thalecres |
|            |       |             |        |    |          | Aac44727 Arabidops |
|            |       |             |        |    |          | Aac45323 Arabidops |
|            |       |             |        |    |          | Aad17591 DNA (Seq) |
|            |       |             |        |    |          | Aac47965 Arabidops |
|            |       |             |        |    |          | Aac40774 Arabidops |
|            |       |             |        |    |          | Abz12690 Arabidops |
|            |       |             |        |    |          | Abz12294 Arabidops |
|            |       |             |        |    |          | Aac41206 Arabidops |
|            |       |             |        |    |          | Aac44993 Arabidops |
|            |       |             |        |    |          | Aad17590 DNA (Seq) |

|    |       |      |      |   |           |           |
|----|-------|------|------|---|-----------|-----------|
| 24 | 425   | 31.2 | 683  | 9 | ADC75696  | DNA homol |
| 25 | 419   | 30.8 | 1037 | 9 | ADC76318  | DNA homol |
| 26 | 415.2 | 30.6 | 918  | 3 | AAC41635  | Arabidops |
| 27 | 415.6 | 30.5 | 1006 | 9 | ADC75697  | DNA homol |
| 28 | 408.2 | 30.0 | 614  | 9 | ADC75699  | DNA homol |
| 29 | 408.2 | 30.0 | 614  | 9 | ADD16770  | DNA (Seq) |
| 30 | 383.2 | 28.1 | 933  | 9 | ADD16769  | DNA (Seq) |
| 31 | 381.6 | 28.0 | 913  | 9 | ADC76310  | DNA homol |
| 32 | 375.8 | 27.6 | 657  | 8 | ACLA17131 | DNA (Seq) |
| C  | 369   | 27.1 | 894  | 9 | ADC76316  | DNA clone |
| 33 | 369   | 27.1 | 894  | 9 | ADC76317  | DNA clone |
| 34 | 369   | 27.1 | 1431 | 3 | AAO1246   | O-acetyl  |
| 35 | 369   | 27.1 | 1431 | 3 | AAO1246   | O-acetyl  |
| C  | 360.2 | 26.4 | 1200 | 7 | ADA69647  | Rice gene |
| 37 | 358.8 | 26.3 | 1200 | 7 | ADA69647  | Rice gene |
| 38 | 357.6 | 26.3 | 1417 | 3 | RAC51477  | Arabidops |
| 39 | 356.2 | 26.2 | 1481 | 4 | RAC51477  | Arabidops |
| 40 | 356.2 | 26.2 | 1523 | 4 | ABA01245  | Arabidops |
| 41 | 337.4 | 24.8 | 1523 | 4 | ABA01245  | Arabidops |
| C  | 337.2 | 24.8 | 1523 | 4 | ABA01245  | Arabidops |
| 42 | 335.2 | 24.6 | 528  | 7 | ABX57527  | Arabidops |
| 43 | 333   | 24.4 | 506  | 9 | ADD16772  | DNA (Seq) |
| 44 | 333   | 24.4 | 506  | 9 | ADD16772  | DNA (Seq) |
| C  | 330.4 | 24.4 | 675  | 8 | ACLA17144 | DNA clone |

ALIGNMENTS

RESULT 1  
AAV99906  
ID AAV99906 standard, cDNA; 1362 BP.  
XX  
AC AAV99906;  
XX  
DT 27-SEP-1999 (first entry)  
XX  
DE Fragment of cysteine synthase gene.  
XX  
XX Biosynthesis; biosynthetic pathway; lysine; threonine; methionine;  
XX cysteine; isoleucine; amino acid; homoserine kinase;  
XX aspartic semialdehyde dehydrogenase; diaminopimelate decarboxylase;  
XX cysteine synthase; cystathione beta-lyase; gene expression; screening;  
XX inhibition; ss.  
XX Glycine max.  
XX  
XX Key Location/Qualifiers  
XX CDS 90..1067  
XX /\*tag= a  
XX /product= "Cysteine synthase fragment"

XX MO9856935-A2.  
XX  
XX 17-DEC-1998.  
XX  
XX 11-JUN-1998; 98WO-US012073.  
XX  
XX 12-JUN-1997; 97US-0049406P.  
XX 12-NOV-1997; 97US-0063385F.  
XX (DUPO) DU PONT DE NEMOURS & CO E. I.  
XX Falco SC, Allen SM, Thorpe CJ;  
XX WPI; 1999-080910/07.  
XX P-PSDB; AAW81018.  
XX  
XX New isolated plant amino acid biosynthetic enzyme nucleic acids - which  
XX encode aspartic semialdehyde dehydrogenase, diaminopimelate  
XX decarboxylase, homoserine kinase, cysteine synthase and cystathionine  
XX beta-lyase.  
XX  
XX Claim 17; Page 57-59; 80pp; English.

